Red Wolf Recovery Program

Release of wild female red wolf, Pocosin Lakes National Wildlife Refuge
Photo credit: Becky Bartel/USFWS

2nd Quarter Report

January – March 2013

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The Red Wolf Recovery Program

The red wolf (*Canis rufus*) is one of the most endangered canids in the world. Once occurring throughout the eastern and south-central United States, red wolves were decimated by predator-control programs and the loss and alteration of habitats. By the 1970s, these activities had reduced the red wolf population to a small area along the Gulf coast of Texas and Louisiana. To protect the species from extinction, the U.S. Fish and Wildlife Service initiated efforts to locate and capture as many red wolves as possible for the purposes of establishing a program to breed the species in captivity and one day reintroduce the species into a portion of its former range. More than 400 canids were captured in coastal areas of Texas and Louisiana, but only 17 were identified as pure red wolves. Fourteen of these wolves would become the founding members of the captive-breeding program and the ancestors of all red wolves existing today.

The first litter of red wolves born in captivity occurred in 1977. Within a few years red wolves were successfully reproducing in captivity, allowing the U.S. Fish and Wildlife Service to consider reintroducing the species in the wild. In 1987, four male-female pairs of red wolves were released in Alligator River National Wildlife Refuge (ARNWR) in northeastern North Carolina and designated as an experimental population. Since then, the experimental population has grown and the recovery area expanded to include four national wildlife refuges, a Department of Defense bombing range, state-owned lands, and private lands, encompassing about 1.7 million acres.

Adaptive Management

The recovery and restoration of red wolves requires the careful management of eastern coyotes (*C. latrans* var.) and occasionally wolf-coyote hybrids in the red wolf recovery area. The non-native coyotes spread across North Carolina to the red wolf recovery area in the early to mid-1990s. It soon was recognized that interbreeding between red wolves and eastern coyotes would produce hybrid offspring resulting in coyote gene introgression into the wild red wolf population, and that this introgression would threaten the restoration of red wolves. An adaptive management plan was developed to reduce interbreeding and introgression while simultaneously building the red wolf population. The adaptive management plan effectively uses techniques to capture and sterilize hormonally intact coyotes via vasectomy or tubal ligation, then releases the sterile canid at its place of capture to act as a territorial "placeholder" until the animal is replaced by wild red wolves. Sterile coyotes are not capable of breeding with other coyotes, effectively limiting the growth of the coyote population, nor are they capable of interbreeding with wild red wolves, limiting hybridization events. In addition, the sterile canid will exclude other coyotes from its territory. Ultimately, the placeholder canids are replaced by the larger red wolves either naturally by displacing the coyote or via management actions (e.g., removal of the coyote followed by insertion of wild or translocated wolves). Coyotes that are captured on private property are euthanized at the landowner's request.

Currently, adaptive management efforts are making progress in reducing the threat of coyotes to the red wolf population in northeastern North Carolina. Other threats, such as habitat fragmentation, disease, and anthropogenic mortality, also are of concern in the restoration of red wolves. Efforts to reduce these threats are presently being explored.

Program Objectives

The current recovery plan (U.S. Fish and Wildlife Service, 1990) specifies the following objectives:

1) Establish and maintain at least three red wolf populations via restoration projects within the historic range of the red wolf. Each population should be numerically large enough to have the potential for allowing natural evolutionary processes to work within the species. This must be paralleled by the cooperation and assistance of at least 30 captive-breeding facilities in the United States.
2) Preserve 80% to 90% of red wolf genetic diversity for 150 years.
3) Remove threats of extinction by achieving a wild population of approximately 220 wolves and a captive population of approximately 330 wolves.

4) Maintain the red wolf into perpetuity through embryo banking and cryogenic preservation of sperm.

Northeastern North Carolina Restored Population

We estimate between 90 and 110 red wolves in the Red Wolf Recovery Area, but for the purposes of this report all population figures are comprised only of known canids (i.e., those that are regularly monitored through either a functioning radio-collar or surgically implanted abdominal radio transmitter). Additional wolves are likely present, but have not been captured/radio-collared or their continued presence otherwise confirmed.

Beginning with the first quarter of the fiscal year 2012 (FY12) we have changed the way we report population and pack numbers. This change more accurately represents the managed population of canids that are part of our efforts to restore red wolves. The managed population includes wolf packs (i.e., packs consisting entirely of wolves) and mixed packs (i.e., packs of a wolf and sterile coyote pair). A pack is defined as at least two known canids cooperatively inhabiting an established territory.

Population and Territory Status

A total of 70 known red wolves occupied the Red Wolf Recovery Area (i.e., 1.7 million acres in five counties in northeastern North Carolina) at the end of the second quarter of our fiscal year 2013. The population includes 14 wolf packs (comprised of 46 wolves and 12 breeding pairs), and 10 mixed packs (comprised of 11 wolves and 10 sterile coyotes). An additional 13 wolves are not known to be associated with a pack.

A total of 76 sterile coyotes were monitored in the Red Wolf Recovery Area at the end of this quarter.

Wolf Pairings

One breeding pair of red wolves formed during the quarter. This likely was the result of the two wolves being captured and held together for a period of time before being released together in the female's territory. Her previous mate had been lost to gunshot during the 2012 fall hunting season.

Two mixed pairs (wolf-coyote) split up during the quarter, and three new mixed pairs formed. In all three cases, the new pair documentation was due to capturing, sterilizing, and releasing a previously unknown coyote that had paired with a wolf.

Wolf Captures and Radio-Telemetry Marking

Twenty-four red wolves were captured during the quarter, eight of which were first-time captures. All first-time captures were fitted with radio-telemetry collars (VHF or GPS) or surgically implanted with abdominal radio transmitters, and released. Captured red wolves consisted of 14 males and 10 females; 11 adults (>2 years), five juveniles (1-2 years), and eight pups (<1 year of age).

Thirty-one coyotes were captured and released during the quarter, 29 of which were first-time captures. All captured coyotes were sterilized before being radio-collared and released, and consisted of eight males and 23 females.

Dispersals

Three known male red wolves dispersed from their natal territories during the quarter: One adult (>2 years), one juvenile (1-2 years), and one pup (<1 year).

No known displacements occurred during the quarter.

Mortalities

Four wolves (1 male, 3 females) from the Red Wolf Recovery Area are known to have died during the quarter. Mortalities consisted of three adult wolves (>2 years) and one juvenile (1-2 years). Two of the deaths were the result of gunshot and are currently under investigation by the U.S. Fish and Wildlife Service's Office of Law Enforcement, one death appeared to be the result of vehicle collision, and one death was related to private trapping efforts.

Two radio-collared coyotes (both female juveniles) were known to have died during the quarter, one from gunshot and one from interspecific competition.

Disappearances

The Red Wolf Recovery Program lost radio contact with one adult female coyote during the quarter.

Pack Summaries

The Pack Summaries *section has been indefinitely discontinued due to recent events and current circumstances involving the apparent illegal take of red wolves within the Red Wolf Recovery Area.*

Species Survival Plan (SSP) Managed Population

Red Wolf Species Survival Plan (RWSSP) cooperating facilities are coordinated and managed by the SSP Coordinator and based at Point Defiance Zoo & Aquarium (PDZA) in Tacoma, Washington. The following information is based on activities completed or conducted by the SSP Coordinator during the quarter reported.

SSP Population Status

The SSP coordinates 42 captive facilities (e.g., approved zoos and nature centers) throughout the United States, housing 188 wolves, ranging from pups to geriatrics, at the end of the second quarter.

Breeding / Transfer Recommendations

The SSP Coordinator reported that a total of three wolves (all males) were transferred to two different SSP facilities.

Mortalities

One adult male wolf housed at the Western North Carolina Nature Center (WNC; Asheville, NC) and one adult female wolf at the Chattanooga Arboretum and Nature Center (Chattanooga, TN) were reported to have died during the second quarter.

SSP Facilities Updates

The 2012 International Red Wolf Studbook was completed and distributed to designated individuals and organizations as required by the World Association of Zoos and Aquariums (WAZA) International Studbook distribution list and posted on the Association of Zoos and Aquariums (AZA) Website.

The Trevor Zoo (Millbrook, NY) and the Red Wolf Recovery Program will share net proceeds with the International Crane Foundation through the Trevor Zoo's involvement with the Keep Safe Project fundraising event. Information about the Keep Safe Project and fundraising event can be found at – www.keepsafeproject.com.

The SSP Coordinator reported that PDZA staff conducted semen collection, evaluation, and cryo-banking (i.e., sample quality warranted banking) from a total of nine red wolves. Thanks to Karen Goodrowe-Beck, PhD, RWSSP Reproduction Advisor, and to the PDZA animal care and veterinary staff and staff at Wolf Haven International.

The SSP Coordinator also received notification from the Oklahoma City Zoo that they will be ending their participation in the RWSSP and therefore are seeking placement of their red wolf pair.

Other Activities

The SSP Coordinator provided a PhD student at George Mason University with information for her project entitled, "Development of Zoological Information Management System (ZIMS): Linking in situ and ex situ data management for conservation.

SSP staff performed an evaluation of post thaw motility and slide preparation of sperm samples, and collected morphological measurements for the Toronto Zoo. Inbreeding coefficients from individual's sampled were provided to cooperating investigators, Albrecht Schulte-Hostedde, Laurentian University, and Gabriela Mastromonaco, Toronto Zoo, for their research entitled "Sperm morphology and motility of the red wolf (*Canis rufus*)."

Island Propagation Sites

The U.S. Fish and Wildlife Service utilizes island sites to propagate red wolves and contribute to the restoration of a wild red wolf population, primarily by inserting island-born wolves into the wild population as a means to augment the wild red wolf gene pool with "under-represented" genes from the captive population. Currently, the Red Wolf Recovery Program cooperates with St. Vincent National Wildlife Refuge in maintaining a breeding pair of red wolves on an island site.

Collaborations

Research

The Red Wolf Recovery Program provided financial and in-kind support for collaborative research with scientists at other institutions, including universities, interagency divisions, and non-government research organizations. These investigations required project staff to assist outside researchers and graduate students in their efforts to better understand red wolf ecology, ecosystem function, and conservation efforts.

Project Title: Prevalence of cystic endometrial hyperplasia and its effect on reproduction in the red wolf (*Canis rufus*).
Graduate Student: n/a
Committee Chair/Principal Investigator: Kadie Anderson, DVM, and Karen Wolf, DVM, Dipl. ACZM, Point Defiance Zoo & Aquarium (PDZA)

Project Title: Inbreeding avoidance in red wolves.
Graduate Student: Kristin Brzeski (PhD student)
Committee Chair/Principal Investigator: Sabrina Taylor, PhD, Louisiana State University

Project Title: Identifying management procedures to reduce red wolf-coyote interactions in eastern North Carolina.
Graduate Student: Joseph Hinton (PhD student)
Committee Chair/Principal Investigator: Michael Chamberlain, PhD, University of Georgia

Project Title: Use of stable isotope analysis to elucidate predation patterns of sympatric canids.
Graduate Student: Anne-Marie Hodge (MS student)
Committee Chair/Principal Investigator: Brian Arbogast, PhD, University of North Carolina at Wilmington

Project Title: Evaluating potential effects of widening US Highway 64 on red wolves, Washington, Tyrrell, and Dare Counties, North Carolina.
Graduate Student: Christine Proctor (PhD student)
Committee Chair/Principal Investigator: Michael R. Vaughan, PhD, Virginia Polytechnic Institute and State University (Virginia Tech)

Project Title: Sperm morphology and motility of the red wolf (*Canis rufus*).
Graduate Student: n/a
Committee Chair/Principal Investigators: Albrecht Schulte-Hostedde, PhD, Laurentian University, and Gabriela Mastromonaco, PhD, Toronto Zoo

Publications

The following publications have gone to print in this quarter. A complete list of publications related to red wolves can be found at http://www.fws.gov/redwolf/images/20121030_Bibliography.pdf.

Beeland, T.D. 2013. Are red wolves worth the trouble? Slate Magazine [Available Online Edition at http://www.slate.com/articles/health_and_science/animal_forecast/2013/02/red_wolf_recovery_program_will_climate_change_destroy_red_wolf_habitat.html].

Bohling, J.H., J.R. Adams, and L.P. Waits. 2013. Evaluating the ability of Bayesian clustering methods to detect hybridization and introgression using an empirical red wolf data set. Molecular Ecology 22: 74-86.

Dellinger, J.A., C. Proctor, TD. Steury, M.J. Kelly, and M.R. Vaughan. 2013. Habitat selection of a large carnivore, the red wolf, in a human-altered landscape. Biological Conservation 157: 324-330.

Presentations

No presentations by collaborators were reported during this quarter.

Staff and Volunteers

The Red Wolf Recovery Program employs eight full-time staff, including the program coordinator, assistant coordinator, field coordinator, three wildlife biologists, a biological technician, and an administrative assistant. The Red Wolf Recovery Program also benefits from unpaid interns (Caretakers).

Outreach

Staff from the Red Wolf Recovery Program conduct presentations and attend events to inform and educate the public on the conservation needs of the red wolf and the restoration efforts of the Red Wolf Recovery Program. As part of our effort to assist educators, red wolf “discovery boxes” that include materials about the red wolf are distributed to educational facilities. The distribution of discovery boxes is managed by the Red Wolf Coalition. Requests for discovery boxes should be made to kwheeler@redwolves.com.

The Red Wolf Recovery Program also seeks to achieve a quality visitor and participant experience in the U.S. Fish and Wildlife Service’s priority recreational uses on National Wildlife Refuges. Our outreach efforts focus on four of the six program elements, including wildlife observation, wildlife photography,

environmental education, and interpretation, and are conducted frequently in partnership with ARNWR and Pocosin Lakes National Wildlife Refuge (PLNWR) educators and volunteers.

Presentations

Date	Location	Audience	Length	Attendance	Presenter
March 12	Manteo, NC	Kindergarten Wildlife Club	0.75 hrs (3x)	60	C. Heffley
March 13	Kill Devil Hills, NC	OBX Green Drinks	1 hr	~20	B. Bartel
March 14	Manteo, NC	Kindergarten Wildlife Club	0.75 hrs (3x)	60	C.Heffley/ D.Vice/S. Vice
March 15	Manteo, NC	Preschool Junior Naturalists	1 hr	15	C.Heffley/ D.Vice/S. Vice
March 20	Nags Head, NC	Kindergarten Wildlife Club	0.75 hrs (2x)	48	C.Heffley/ D.Vice/S. Vice
March 21	Nags Head, NC	Kindergarten Wildlife Club	0.75 hrs (2x)	48	C.Heffley/ D.Vice/S. Vice
March 28	Clemson University	Conservation Biology Class	0.5 hr	~70	D. Rabon
March 28	Clemson University	Graduate Student Luncheon	1 hr	18	D. Rabon
March 28	Clemson University	Agriculture and Natural Resources Seminar	1.5 hrs	45	D. Rabon

Website / Social Media

The Red Wolf Recovery Program has launched Facebook, Twitter, and Flickr pages. Our Facebook page connects our program with "friends" from around the world and informs them of the conservation efforts of the Red Wolf Recovery Program. Like us on Facebook at www.facebook.com/redwolfrecoveryprogram. The Twitter page also allows "followers" to connect with our program. Follow us on Twitter (www.twitter.com/redwolfrecovery) at @redwolfrecovery. Our Flickr page provides a site for users to view and download high resolution pictures related to red wolves and the Red Wolf Recovery Program. Our Flickr page can be found at www.flickr.com/photos/trackthepack.

The Red Wolf Recovery Program also has a weblog that highlights the efforts of the Red Wolf Recovery Program staff in the conservation of the red wolf. The weblog combines text, images, videos, and links to other media related to its topic. The content includes educational, informational, and general journal entries written by program staff, and allows readers to leave comments in an interactive format. The weblog can be found at trackthepack.blogspot.com.

Media Inquires

The Red Wolf Recovery Program responded to numerous media inquiries during this quarter, including the British Broadcasting Corporation (BBC), whose staff visited the recovery area for several days in March to film footage for their Pole to Pole Deadly 60 television show.

Partnerships

Red Wolf Coalition

The Red Wolf Coalition (RWC), a not-for-profit education organization based in Columbia, NC, advocates for the long term survival of wild red wolf populations by teaching about red wolves and by engaging the public in red wolf conservation. The RWC's web site (www.redwolves.com) provides information about the history, biology, and ecology of red wolves, as well as news about red wolf restoration. The RWC gives red wolf programs to school groups, professional organizations, university students, and other groups. The RWC also conducts workshops for teachers and non-formal educators, including people seeking certification in environmental education.

The RWC is working as an advisor on an ecotourism project with East Carolina University and Pitt Community College. This project involves design students from both schools and is using Palmetto Peartree Preserve, in Columbia, NC, as its base for the project. Students are working in groups to come up with a design and implementation plan for building construction, outdoor activities, and community involvement. This project is not funded, but is to give students the necessary tools needed to work in their chosen design fields. The final proposals will be presented to the public on April 22, 2013 from 10am to 3pm in the auditorium at the Pocosin Lakes National Wildlife Headquarters in Columbia, NC.

The Executive Director of RWC met with legislators in Raleigh to discuss the state rules allowing the hunting of coyotes at night and the impact it has on red wolf conservation in northeastern North Carolina.

The RWC hosted a group from the NC Museum of Science for their annual trip to northeastern North Carolina. A program about red wolf conservation was presented to 16 people at the Pungo Unit of Pocosin Lakes National Wildlife Refuge. The RWC Executive Director also reported conducting several education programs during the quarter, including presentations to the Cape Fear Sierra Club (Wilmington, NC), to members of the North Carolina Wildlife Society, to students of East Carolina University and Pitt Community College (Greenville, NC), to Edenton Alternative School (Edenton, NC), and to Superior Court Judge Russell Duke (Greenville, NC). The RWC participated in the science expo at the Hertford Grammar School. Lastly, the Executive Director of RWC gave a red wolf presentation at the Public Interest Environmental Law Conference in Eugene, OR.

The RWC has three Red Wolf Discovery Boxes for all grade levels available for educational use. These boxes are filled with a variety of hands-on items, activities and artifacts that help students explore the world of red wolves. The red wolf curriculum *Far Traveler* and a variety of books and other resources also are included. Contact Kim Wheeler at 252-796-5600 or kwheeler@redwolves.com for more information or to reserve your Red Wolf Discovery Box. The RWC distributed Red Wolf Discovery Boxes to four schools during the quarter.

Announcements

The U. S. Fish and Wildlife Service is requesting assistance with an investigation involving the suspected illegal take of a radio-collared red wolf that was recently found dead. The wolf was found with a suspected gunshot wound on January 18, 2013, north of the Town of Fairfield, in Tyrrell County, North Carolina. Anyone who has essential information that directly leads to an arrest, a criminal conviction, a civil penalty assessment, or forfeiture of property on the subject or subjects responsible for the suspected unlawful take of these red wolves may be eligible for a reward of up to $2,500. The red wolf is protected under the Endangered Species Act. The maximum criminal penalties for the unlawful taking of a red wolf are one year imprisonment and $100,000 fine per individual. Anyone with information on the death of this red wolf or any others, past or future, is urged to contact Special Agent Sandra Allred at (919) 856-4786, Refuge Officer Frank Simms at (252) 216-7504, or North Carolina Wildlife Resources Commission Officer Robert Wayne at (252) 216-8225.